Research Paper | Medicine | E-ISSN No : 2454-9916 | Volume : 3 | Issue : 11 | Nov 2017

ROLE OF THE BISAP SCORE TO PREDICT THE SEVERITY AND PROGNOSIS OF ACUTE PANCREATITIS

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ABSTRACT

Objectives: To grade the severity of acute pancreatitis and determine its prognosis by the BISAP score.

Methods: The BISAP score was evaluated among 50 cases of acute pancreatitis admitted to Shree Krishna Hospital, Karamsad between March 2014 and September 2015. Data analysis was done using SPSS program version17.0. Demographic data, etiology, distribution of cases according to BISAP score, morbidity and mortality were used to determine frequencies distribution and proportion.

Results: Among 50 cases, there were 3 (6%) deaths. There was a significant trend for increasing mortality with increasing BISAP score. A BISAP score of more than 3 was associated with an increased risk of developing organ failure, pancreatic necrosis and other complications.

Conclusion: The BISAP score represents a simple way to identify patients at risk of increased mortality and the development of complications within 24 hours of presentation. This risk stratification capability can be utilized to improve clinical care and administer appropriate treatment from as early as the time of presentation to the hospital.

KEY WORDS: Acute Pancreatitis, BISAP score.

INTRODUCTION:

Acute pancreatitis is defined as an inflammatory process of the pancreas with variable involvement of peripancreatic tissues and remote organ systems. Most of the time, the disease is mild, with interstitial oedema, and leads to recovery within a few days or weeks.[1]

Diagnosis of Acute Pancreatitis:

- **Clinical presentation:**
  Patients with AP may suffer from a multitude of symptoms, including upper abdominal pain, fever, nausea and vomiting, ileus and jaundice.[2] None of these frequent symptoms are related to the severity of the disease.

- **Laboratory diagnostics:**
  Biochemical diagnosis of AP is based on the determination of serum and/or urinary amylase activity[3], the activity of which increases in serum within 2-12 hours of the onset and returns to normal within 3-5 days[4]. However, 19% of the AP patients have a normal amylase value.[5] Also hyperamylasaemia may occur in many extrapancreatic diseases such as acute cholecystitis, small bowel obstruction and peptic ulcers resulting in low specificity.[6] Because serum lipase remains elevated longer than serum amylase, it is more useful when there is a delay between the onset of symptoms and admission.[3]One of the main problems with AP has been the lack of accurate predictors of disease severity and the development of organ failure in the early stages of the disease. On admission, clinical assessment of severity has been shown to be unreliable[7] and the severity of AP is independent of the level of serum amylase and lipase[8] CECT has improved the assessment of the disease severity by accurately identifying areas of necrosis.[9]Early deaths, within the first week, are due to persistent Systemic Inflammatory Response Syndrome (SIRS). Late mortality is a consequence of organ dysfunction and local or systemic infections, including infected pancreatic necrosis.[9]

In order to give each patient the best possible treatment early, classification of the severity of disease is required on presentation.

Patients who are at risk of complications need to be identified in order to initiate effective preventive management as soon as possible, before the development of complications. This can be achieved by an adequate specific scoring system available at admission, which does not require time-consuming calculations like the scores being used at present.

This study aims to provide a single bedside scoring system proposed by Wu et al. in 2008, the bedside index of severity in acute pancreatitis (BISAP), that is reliable, convenient and accurate means for stratifying patients with acute pancreatitis incorporating all the three – clinical, biochemical and radiological findings.

MATERIALS AND METHODS:

A total of 50 cases of acute pancreatitis from March 2014 to September 2015 were taken up for study. Routine information like age, sex and other brief facts of the cases were collected from the patient files.

Design:

An observational prospective, hospital-based study involving observation of patients from day of admission to final outcome of management at discharge or death.

Setting:

The study was conducted in the department of surgery of Pramukhswami Medical College Karamsad. Patients being admitted from emergency or outptatient department, diagnosed with acute pancreatitis were admitted either to the ward or ICU as per clinical evaluation.

Patients:

All consecutive admissions of patients with acute pancreatitis admitted in the department of surgery from March 2014 to September 2015.

Inclusion Criteria:

- All age groups were included.
- Both sexes were included.
- Patients diagnosed to have acute pancreatitis on the basis of history and raised serum amylase and lipase levels at least three times above the upper reference limit (URL) and confirmed with CECT and/or USG.

Exclusion criteria:

- Patients with pancreatic cancer.
- Immunocompromised patients.
- Patients with liver disease.
- Patients with other gastrointestinal pathology.

Ethical consideration:

Ethical clearance was sought for conducting the research from the Research Ethics committee before carrying out the study, permission was also sought from the management. Written and informed consent was taken from the patients themselves and relatives/ guardians after informing them about the purpose of the study.

Scoring system:
BISAP score:
Within 24hrs of presentation:

- BUN>25
- Impaired mental status by GCS score.
- SIRS defined by the presence of at least two of the following:

  Pulse > 90 beats per minute

  Respiratory rate > 20 per minute

  PaCO2 < 32 mmHg

  Temperature > 38'F or < 37'F

  White blood cell count > 12,000 or < 4,000 cells/mm^3, or > 10% immature neutrophils (bands).
- Age>60yrs
- Pleural effusion on imaging studies

One point is assigned for each variable within 24 h of presentation and added for a composite score of 0 – 5.

Impaired mental status was assessed by a Glasgow Coma Scale score of < 15 within 24 h of presentation. The presence of a pleural effusion was determined by a CT scan, chest radiograph, or abdominal ultrasound obtained within 24 h of presentation. Imaging obtained within 24 h of presentation at the hospital of origin for transferred patients was also collected and reviewed.

Outcome Measures:
These included length of ICU and overall hospital stay, morbidity and mortality. All patients were followed up to death for patients who died while still inpatient or upto discharge for survivors.

Statistics:
Manual analysis was carried out through sorting out all the questionnaires collected. Data were entered in the computer by the principal investigator followed by data cleaning. Data analysis was done using SPSS program version17.0. Demographic data, etiology, distribution of cases according to BISAP score, morbidity and mortality were used to determine frequencies distribution and proportion. There were no losses to observation.

RESULTS AND DISCUSSION:

1. **Gender wise distribution of acute pancreatitis cases:** Total 50 patients were included in the study out of which 44 were males and 6 were females that is 88% and 12 % respectively.

2. **Prevelance of acute pancreatitis in various age groups:** Out of the total 50 patients, the distribution under various age groups was as given in Table 1. Peak incidence was seen between 30-40 years. Mean age of presentation was 45.2years.

Table 1: Prevelance of acute pancreatitis in various age groups

Age group(yrs)	No. of cases	Percentage
10-20	1	2
20-30	6	12
30-40	13	26
40-50	11	22
50-60	9	18
>60	10	20

3. **Symptomatology of acute pancreatitis:** All the acute pancreatitis patients presented with abdominal pain with or without radiation to the back. Other symptoms on presentation were vomiting, typical right hypochondriac pain suggestive of biliary colic and fever.

4. **Clinical findings in acute pancreatitis patients:** Tenderness on abdominal palpation was present in all cases of acute pancreatitis, out of which 40% cases also had guarding/ rigidity. 40% cases also had raised temperature. Cullen sign and grey turner sign were not seen in any of the 50 cases included in the study.

5. **Distribution of acute pancreatitis on the basis of etiology:** Maximum cases were seen associated with gall stones(58%), 34% with excessive alcohol intake, 4% with each drug induced and idiopathic and 6% with interventions like ERCP.

6. **Complications in acute pancreatitis patients:**
   (i) **Sterile pancreatic fluid in acute pancreatitis:** Sterile pancreatic fluid collection was seen mainly associated with BISAP score 0 and 1 as compared to higher scores. 64.29% of BISAP 0 and 75% of BISAP 1 patients.

   (ii) **Pancreatic necrosis in acute pancreatitis:** Pancreatic necrosis was seen in patients with BISAP score 3 and 4 with 42.85% of BISAP 3 and 66.67% of BISAP 4 patients involved.

   (iii) **Pancreatic abscess in acute pancreatitis:** Pancreatic abscess was seen in BISAP 3 and 4 patients with 14.28% of BISAP 3 and 33.33% of BISAP 4 patients.

   (iv) **Pancreatic pseudocyst in acute pancreatitis:** It was mainly associated with BISAP score 0 and 1 as compared to higher scores. 64.29% of BISAP 0 and 75% of BISAP 2 patients.

   (v) **Pleural effusion in acute pancreatitis:** Pleural effusion was seen in 12.2% of BISAP 1, 10% of BISAP 2, 14.28% of BISAP 3 and 66.67% of BISAP 4 patients.

   (vi) **Renal failure in acute pancreatitis:** Renal failure was seen in 6.25% of BISAP 1, 57.14% of BISAP 3 and all the BISAP 4 patients.

7. **Incidence of MODS associated with Acute Pancreatitis:** MODS was seen in BISAP 3 and 4 patients with 10% of BISAP 3 and all the BISAP 4 patients.

8. **Distribution of acute pancreatitis patients according to BISAP scores:** BISAP score was allotted to all the cases on presentation and maximum cases belonged to score 0(28%) and 1(32%). (Figure 1). The distribution of cases according to BISAP score was 14, 16, 10, 7, 3, 0 respectively for BISAP score 0,1, 2, 3, 4 and 5.

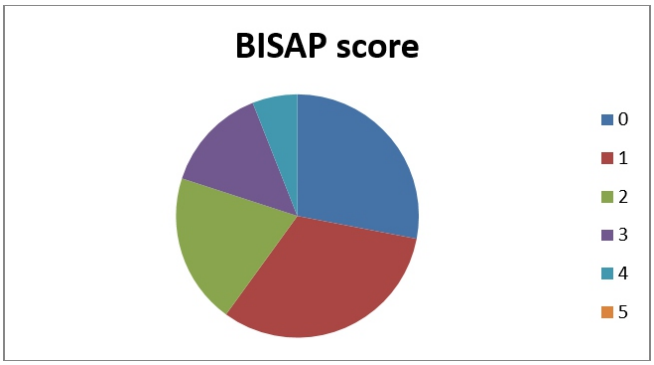

Figure 1: Distribution of acute pancreatitis patients according to BISAP scores

9. **Prognosis of patients using BISAP score:** The average hospital stay for mild, moderate and severe pancreatitis patients as per BISAP score was 7, 10 and 15 respectively (Table 2). The prognosis of the patient progressively reduced with increasing BISAP score.

Table 2: Prognosis of patients using BISAP score

BISAP score	Average days of hospital stay	Average days of ICU stay	No. of days of systemic antibiotic administeration
0/1	7	0	3
2/3	10	3	5
4/5	15	10	10

10. **Mortality seen in patients of acute pancreatitis and correlation with the BISAP score:** 3 out of 50 selected cases had a mortality out of which 2 belonged to BISAP score 4 and 1 to BISAP score of 3 that is rate of mortality is 6% (3/50), most common cause of which was due to multi-organ failure and septicemia in patients with infected pancreatic necrosis.

11. **Grading of severity of pancreatitis on the basis of BISAP score:** In our study, patients with BISAP scores 0 and 1 were considered to have mild pancreatitis (60%), 2 and 3 as moderate pancreatitis (34%) and 4 and 5 as severe pancreatitis (6%) (Table 8).

    In the study by V K Singh et al[10] ,BISAP scores of more than or equal to 3 carry a 7.4 fold higher risk of developing organ failure

12. The most widely used prognostic scoring system in acute pancreatitis

remains the APACHE II score. However, it has several limitations. The APACHE II score was initially designed as an intensive care unit instrument and therefore contains many variables. The chronic health-profile portion of the score requires knowledge of patient history and medication details, which may not be available if the patient is unconscious, intubated, or transferred from an outside hospital with few medical records. The APACHE II score is also clinically cumbersome and difficult to remember for clinicians. Both the BISAP and APACHE II scores incorporate systemic inflammatory response syndrome, age, and Glasgow Coma Scale. However, with only the addition of blood urea nitrogen and pleural effusion, the BISAP score has a discriminatory ability to predict mortality, which is equivalent to the APACHE II score.

The strengths of our study include the following:

(1) Diagnosis of acute pancreatitis was not based on International Classification of Diseases (ICD)-9 coding but on a careful chart and imaging review as well as patient examination.

(2) Exhaustive efforts were made to collect all clinical and radiographic data from transferring institutions to ensure calculation of complete BISAP scores.

(3) The method of data collection enabled us to evaluate the relationships between the BISAP score and intermediate markers of severity such as organ failure and pancreatic necrosis.

(4) The calculation of BISAP score is clinic-radiological, hence it can be applied in a resource limited set-up. Large administrative databases usually are unable to evaluate these intermediate markers of severity as the data are either not collected or listed by ICD-9 codes, calling into question the reliability of the diagnosis.

The limitations of our study are the following.

(1) The size of our study limits a more extensive evaluation of the ability of the BISAP score to predict organ failure and mortality.

(2) The Glasgow Coma Scale assessment used for the evaluation of impaired mental status is subject to interobserver variation.

(3) The parameters of assessment differ from other scores, thus comparison with them is not reliable.

(4) BISAP score 5 could not be assessed as there was no patient with score 5 in our study.

CONCLUSIONS:

In this study, we have evaluated the ability of the BISAP score to predict prognosis and severity in a prospective cohort of cases with acute pancreatitis.

Complications like pancreatic necrosis, pancreatic abscess, renal failure, MODS were seen to be associated with BISAP score 3 or more. This can be useful as a guide for early prediction of these complications and giving appropriate treatment to such patients from the day of hospital admission.

However, incidence of complications like pseudocyst of pancreas, pleural effusion and sterile pancreatic fluid collection were not related with increasing BISAP score.

In our opinion, the ability of the new and convenient bedside, prognostic, multi-factorial scoring system the BISAP score to stratify patients at risk of mortality within 24 h of presentation will help improve clinical care and facilitate enrollment of appropriate patients with acute pancreatitis in future prospective trials.

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